

AMENDMENT TO THE CLAIMS

This listing of claims will replace all prior versions, and listings of claims in the application.

1. (Currently Amended) A process of producing highly purified acetonitrile having no more than about 0.3 milligrams of acetamide per liter of acetonitrile comprising (1) distilling crude acetonitrile in a first distillation column affixed with a first overhead reflux loop at a first pressure of at least 1 atmosphere to remove HCN, producing a first acetonitrile/water azeotrope and a first bottom product containing water, (2) distilling the first azeotrope in a second distillation column affixed with a second overhead reflux loop at a second pressure less than 1 atmosphere to separate the first azeotrope into a second bottoms product containing water and a second acetonitrile/water azeotrope having a greater acetonitrile concentration than that the first azeotrope, (3) distilling the second acetonitrile/water azeotrope in a third distillation column affixed with a third overhead reflux loop at a third pressure above 1 atmosphere to produce a third acetonitrile/water azeotrope containing substantially all of the water from the second azeotrope, a third bottoms product comprising acetonitrile and heavy organics and a side stream comprising highly pure acetonitrile, and (4) passing the highly pure acetonitrile side stream through an acidic ion exchange resin to further purify said highly pure acetonitrile producing highly purified acetonitrile having a UV cutoff for impurities of <190 nm wherein the reflux ratios in Steps 1, 2 and 3 are kept at greater than 3 to 1, greater than 3.4 to 1 and greater than 6.4 to 1, respectively.

2. (Currently Amended) The process of claim 1 wherein the reflux ratio in step 1 is ~~between~~ greater than about 4.4:1.

3. (Currently Amended) The process of claim 2 wherein the reflux ration in step 2 is ~~between~~ greater than about 4.5:1.

4. (Currently Amended) The process of claim 3 wherein the reflux ratio in step 3 is ~~maintained between~~ greater than about 8:1.

5. (Currently Amended) The process of claim 1 wherein the acidic ion exchange resin is selected to include a strong acid incorporating ~~sulfuric~~ sulfonic acid functional groups.

6. (Original) The process of claim 1 wherein the acidic ion exchange resin is selected to include weak acid resin incorporating carboxylic acid functional groups.

7. (Original) The process of claim 1 further comprising distilling the purified acetonitrile recovered from the acidic ion exchange resin.

8. (Currently Amended) The process of claim 7 wherein the reflux ratio in step 1 is ~~between~~ greater than about 4.4:1.

9. (Currently Amended) The process of claim 8 wherein the reflux ratio in step 2 is ~~between~~ greater than about 4.5:1.

10. (Currently Amended) The process of claim 9 wherein the reflux ratio in step 3 is ~~maintained between~~ greater than about 8:1.

11. (Currently Amended) The process of claim 7 wherein the acidic ion exchange resin is selected to include a strong acid incorporating ~~sulfuric~~ sulfonic acid functional groups.

12. (Original) The process of claim 7 wherein the acidic ion exchange resin is selected to include weak acid resin incorporating carboxylic acid function groups.

13. (Canceled)

14. (New) A process of producing highly purified acetonitrile comprising:

distilling crude acetonitrile in a first distillation column affixed with a first overhead reflux loop operating at a reflux ratio of greater than 3 to 1 and at a first pressure of at least 1 atmosphere for removing HCN to produce a first acetonitrile/water azeotrope and a first bottom product containing water;

distilling the first azeotrope in a second distillation column affixed with a second overhead reflux loop operating at a reflux ratio of greater than 3.4 to 1 and at a second pressure less than 1 atmosphere to separate the first azeotrope into a second bottoms product containing water and a second acetonitrile/water azeotrope having a greater acetonitrile concentration than that of the first azeotrope;

distilling the second acetonitrile/water azeotrope in a third distillation column affixed with a third overhead reflux loop operating at a reflux ratio of greater than 6.4 to 1 and at a third pressure above 1 atmosphere to produce a third acetonitrile/water azeotrope containing substantially all of the water from the second azeotrope, a third bottoms product comprising acetonitrile and heavy organics, and a side stream comprising highly pure acetonitrile; and

passing the highly pure acetonitrile side stream through an acidic ion exchange resin to further purify the highly pure acetonitrile producing highly purified acetonitrile having an assay of at least 99.97% acetonitrile.

15. (New) The process of claim 14 wherein the reflux ratio of the first overhead reflux loop is greater than about 4.4:1; the reflux ratio in the second overhead reflux loop is greater than about 4.5:1; and the reflux ratio in the third overhead reflux loop is greater than about 8:1.

16. (New) The process of claim 14 wherein the acidic ion exchange resin is selected to include a strong acid incorporating sulfonic acid functional groups.

17. (New) The process of claim 14 wherein the acidic ion exchange resin is selected to include weak acid resin incorporating carboxylic acid functional groups.

18. (New) The process of claim 14 further comprising distilling the purified acetonitrile recovered from the acidic ion exchange resin.